

gain. Both empirically and conceptually, Marzano (2002, 2006) has demonstrated that scoring assessments using a 100-point or percentage scale typically is not sensitive to learning over time. In lieu, he offers the scale depicted in table 3.2.

Table 3.2 Generic Scale for Design of Formative Assessments

Score 4.0	In addition to Score 3.0 performance, in-depth inferences and applications that go beyond what was taught.
Score 3.5	In addition to Score 3.0 performance, partial success at inferences and applications that go beyond what was taught (Score 4.0 elements).
Score 3.0	Score 3.0: No major errors or omissions regarding any of the information and/or processes (simple or complex) that were explicitly taught.
Score 2.5	No major errors or omissions regarding the simpler details and processes (Score 2.0 elements) and partial knowledge of the more complex ideas and processes (Score 3.0 elements).
Score 2.0	No major errors or omissions regarding the simpler details and processes (Score 2.0 elements) but major errors or omissions regarding the more complex ideas and processes (Score 3.0 elements).
Score 1.5	Partial knowledge of the simpler details and processes (Score 2.0 elements) but major errors or omissions regarding the more complex ideas and processes (Score 3.0 elements).
Score 1.0	With help, a partial understanding of some of the simpler details and processes (Score 2.0 elements) and some of the more complex ideas and processes (Score 3.0 elements).
Score 0.5	With help, a partial understanding of some of the simpler details and processes (Score 2.0 elements) but not the more complex ideas and processes (Score 3.0 elements).
Score 0.0	Score 0.0: Even with help, no understanding or skill demonstrated.

Copyright 2004 Marzano & Associates. All rights reserved.

The scale in table 3.2 is generic and must be rewritten for specific reporting topics. Before we provide an example of a scale written for a specific topic, it is useful to consider the general characteristics of the scale. The lowest score value on the scale is a 0.0, representing no knowledge of the topic—even with help, the student demonstrates no understanding or skill relative to the topic that is being assessed. A score of 1.0 indicates that *with help*, the student shows partial knowledge of the simpler details and processes as well as the more complex ideas and processes. To be assigned a score of 2.0, the student independently demonstrates understanding of and skill at the simpler details and processes but not the more complex ideas and processes. A score of 3.0 indicates that the student demonstrates understanding of all information and skill—simple and complex—that *was taught in class*. A score of 4.0 indicates that the student demonstrates inferences and applications that *go beyond what was taught in class*. Half-point scores indicate partial credit at the next full-score level.

Using the generic scale depicted in table 3.2 as a guide, all reporting topics at every grade level can be written in the scale format. To illustrate, consider table 3.3.

Table 3.3 Scale for Biological Diversity and Evolution of Life (Grade 8)

Score 4.0	In addition to score 3.0, in-depth inferences and applications that go beyond what was taught such as: <ul style="list-style-type: none"> describing how a genetic disorder (e.g., cystic fibrosis) can be passed from parents to offspring when the parents are healthy
Score 3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.
Score 3.0	While engaged in tasks that address principles of heredity, the student demonstrates an understanding of important information such as: <ul style="list-style-type: none"> distinctions between asexual and sexual reproduction (risk of mutation, energy requirements, similarity of offspring to parent, processes involved) (e.g., explaining how asexual and sexual reproduction differ in their impact on potential mutation of offspring, i.e., describing which type of reproduction has a greater risk of mutation and why the risk is greater) the impact of heredity on organisms (traits, diseases, genetic disorders) (e.g., describing how a trait such as body type can affect the lives of the members of a family across generations) <p>The student makes no major errors or omissions.</p>
Score 2.5	No major errors or omissions regarding the score 2.0 elements and partial knowledge of the score 3.0 elements.
Score 2.0	No major errors or omissions regarding the simpler details and processes such as: <ul style="list-style-type: none"> recognizing and recalling specific terminology, such as: egg, sperm, genetic mutation, offspring, organism, reproduction, heritable characteristics recognizing and recalling isolated details, such as: <ul style="list-style-type: none"> half the genes come from each parent in sexual reproduction heritable characteristics determine an organism's likelihood to survive and reproduce <p>However, the student exhibits major errors or omissions with score 3.0 elements.</p>
Score 1.5	Partial knowledge of the score 2.0 elements but major errors or omissions regarding the score 3.0 elements.
Score 1.0	With help, a partial understanding of some of the score 2.0 elements and some of the score 3.0 elements.
Score 0.5	With help, a partial understanding of some of the score 2.0 but not the score 3.0 elements.
Score 0.0	Even with help, no understanding or skill demonstrated.

Copyright 2007 Marzano & Associates All rights reserved

Table 3.3 depicts the measurement topic of biological diversity and evolution of life at the eighth grade. Similar scales would be designed for each measurement topic in grades kindergarten through grade 8 and for courses at the high school level. Use of scales like that in table 3.3 allows teachers to design and score their own assessments, with the added advantage that scores on those assessments are comparable from teacher to teacher. To illustrate, one teacher might design an assessment for the information in table 3.3 that employs a traditional format with multiple-choice items and short constructed-

DISTRICT LEADERSHIP THAT WORKS

le 3.5 Sample Formative Assessment for Biological Diversity of Life

Section A		
Match each term with one answer that best describes it.		
Vocabulary Term	Answer	
• Egg	a	The process that results in an offspring that is an exact copy of the one parent
• Sperm	b	An individual living system
• Genetic mutation	c	A trait that can be passed from parents to offspring.
• Offspring	d	The contribution of the female in the reproductive process.
• Organism	e	Changes to the nucleotide sequence of the genetic material of an organism
• Reproduction	f	The element of a cell that carries a single unit of information.
• Heritable characteristic	g	The product of reproduction
	h	The element of a cell that allows the cell to split.
	i	The contribution of the male in the reproductive process
	j	The part of the cell that houses the chromosomes.
	k	The biological process by which new individual organisms are produced
Circle "T" if the statement is true and "F" if the statement is false.		
T	F	Half the genes come from each parent in sexual reproduction.
T	F	Heritable characteristics determine an organism's likelihood to survive and reproduce
T	F	Asexual reproduction involves two parents.
T	F	Bears reproduce asexually.
Section B		
1 Write a short explanation of the differences between asexual and sexual reproduction in terms of the following:		
a. Risk of mutation		
b. Energy requirements		
c. Similarity of offspring to parent		
d. Processes involved		
2 Select one of the following and explain how it affects a chosen organism		
a. Inherited trait		
b. Disease		
c. Genetic disorder		
Section C		
1 Explain how a genetic disorder can be passed from parents to offspring when the parents are healthy		

In addition to formative assessment designed by individual classroom teachers, the district should construct formative assessments to be used by all teachers at a specific grade level for a specific reporting topic. This practice has been referred to as "common assessments" (Ainsworth & Viegut, 2006). While this is a useful endeavor, Marzano and Haystead (2008) also recommend a "common item bank" in addition to common